Rec Room Studio Manual - Beta Edition

November 2022

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Background and Resources

Unity Resources

Rec Room Studio is a *Unity Editor Package* that extends the off-the-shelf editor, which is available for free from unity.com. Rec Room Studio adds support for building and publishing Rec Room rooms directly in the Unity Editor. In the future we plan to also support creation of inventions and avatar items within Unity.

The creation tools you use in Rec Room Studio are the same Unity Editor tools that professional Unity developers use to build games and apps.

If you're not familiar with Unity, or need a refresher, here are a few helpful resources:

Unity Manual - Editor interface
Unity Manual - Importing Assets
Unity Manual - Graphics

[Unity Universal Render Pipeline Documentation]

Windows Standalone Rec Room client is a full version of Rec Room that can be installed by the Rec Room Studio installer. You can use this version of Rec Room to play the game or to test your Rec Room Studio projects without publishing them. You can also test your Rec Room Studio projects in the Steam version of Rec Room.

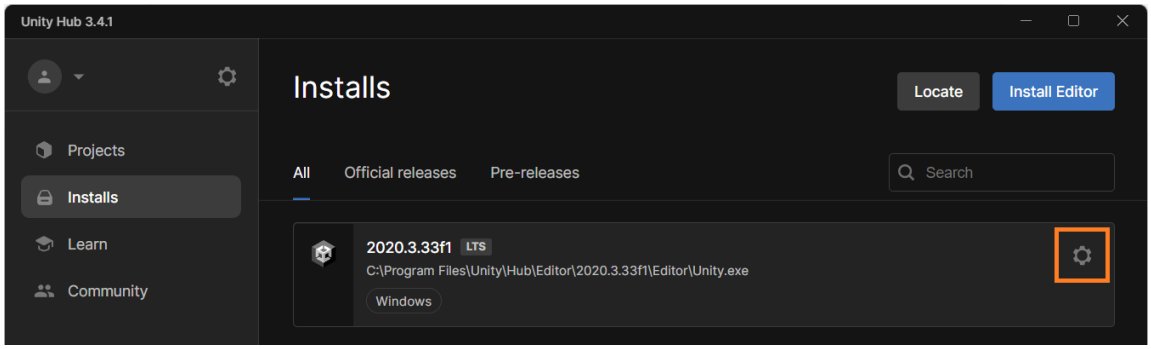
Unity Hub is an application that manages your Unity game projects (including Rec Room Studio projects) and manages installation of the Unity Editor. The Rec Room Studio installer can install Unity Hub for you, or you can download the Unity Hub installer from Unity's website.

Unity 2020.3.33f1 is the specific version of Unity currently required by Rec Room Studio. The Rec Room Studio installer can install this version of the Unity Editor for you once Unity Hub is installed.

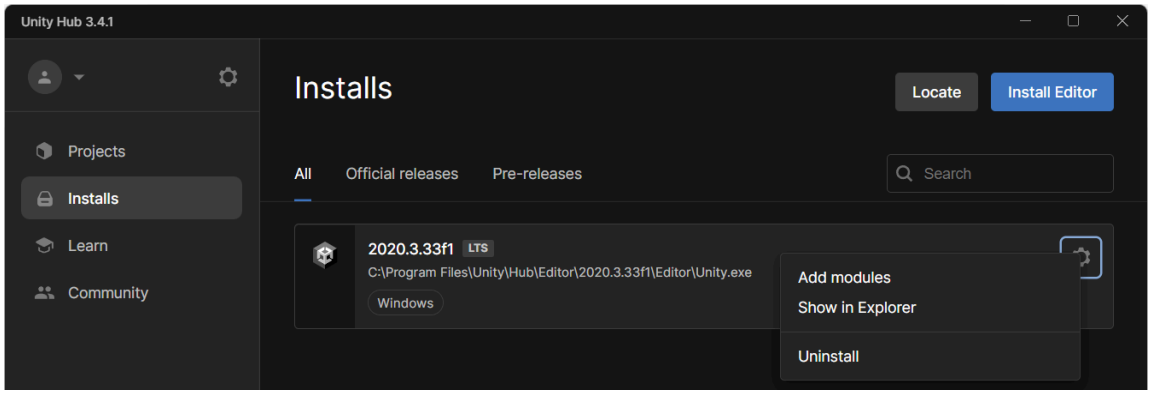
Additional Modules

*If you already have **Unity 2020.3.33f1** installed*, you may not have the **Windows Build Support (IL2CPP)** module required to run local tests of Rec Room Studio projects, as it is not installed by default. You can ensure this module is installed using the **Unity Hub** application:

1. Open the **Unity Hub** application
2. Select the **Installs** option from the list on the left side of the Unity Hub application
3. In the list of **Installs** on the right, locate the entry with the heading **2020.3.33f1**
4. Click the gear icon (highlighted in **orange** in the screenshot below)

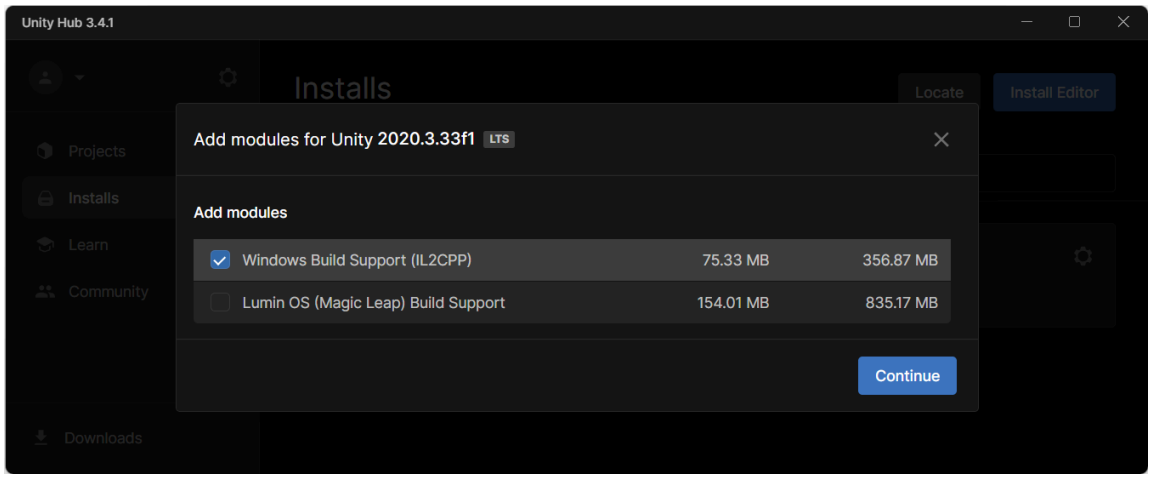


5. A context menu will appear, from which you should select the **Add Modules** option.



NOTE: *If the **Add Modules** option does not appear in this context menu, please quit the Unity Hub application then reopen it and try again. By default, Unity Hub will continue running in the background when you close the Unity Hub window. In order to completely quit the application, look in the Windows System Tray (icons on the taskbar near the clock) for the Unity Hub icon (a stylized cube), then right click that icon and select **Quit Unity Hub** from the context menu.*

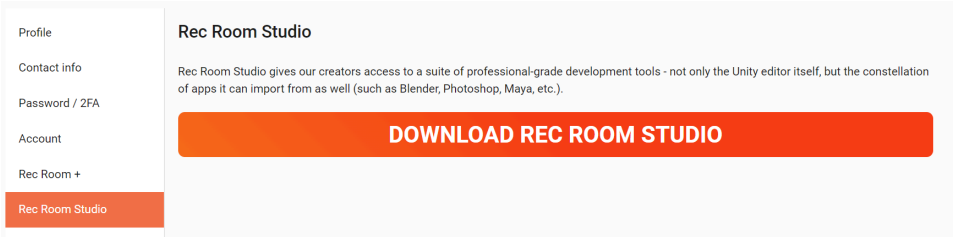
6. A list of additional modules that can be installed for Unity should appear. Scroll down the list until you locate the module **Windows Build Support (IL2CPP)**. If this module is already installed, the word **Installed** will appear to the right of the module name, and you can exit the **Add modules…** dialog. Otherwise there will be an empty check box to the left of the module name. Check this box (as shown in the screenshot below), then click the blue **Continue** button and wait for the module installation to complete.



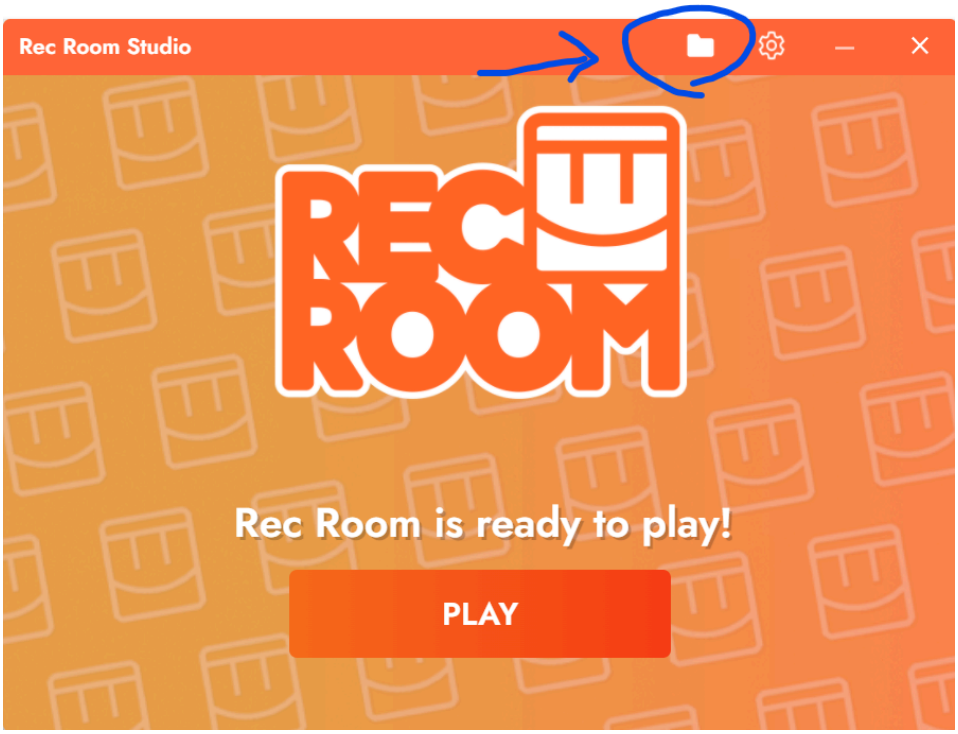
Initial Setup

Step 1. Download and install the Rec Room Studio Launcher

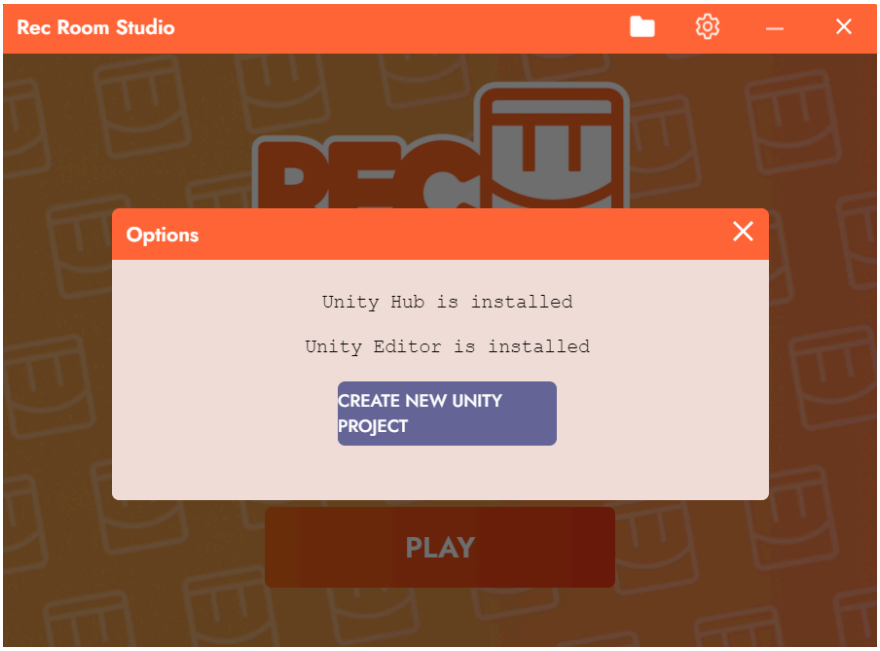
a. In your internet browser on your PC, go to *rec.net/settings/recroomstudio* (make sure you're signed into your Rec Room account you submitted to the beta program survey first)
b. Click the *Download Rec Room Studio* button and open *RecRoomStudioInstaller.exe* when downloaded


Profile
Contact info
Password / 2FA
Account
Rec Room +
Rec Room Studio
Rec Room Studio
Rec Room Studio gives our creators access to a suite of professional-grade development tools - not only the Unity editor itself, but the constellation of apps it can import from as well (such as Blender, Photoshop, Maya, etc.).
DOWNLOAD REC ROOM STUDIO

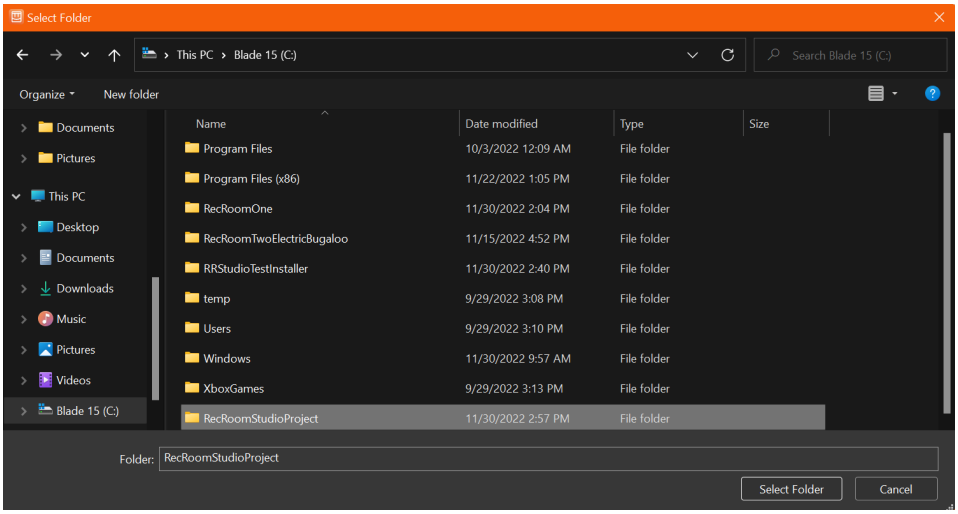
c. The Rec Room Studio installer will download and install Unity Hub, Unity, and Rec Room for PC. It might take awhile…
d. From this window, select the folder icon



e. Select Create New Unity Project

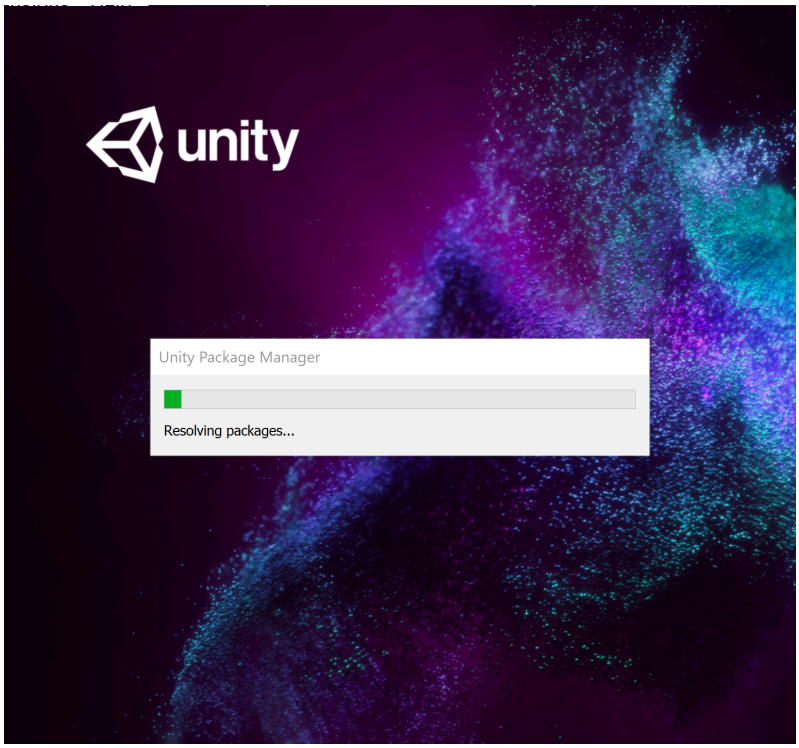


f. Create a new folder on the same hard drive where Unity is installed and name it “RecRoomStudioProject” then click *Select Folder*



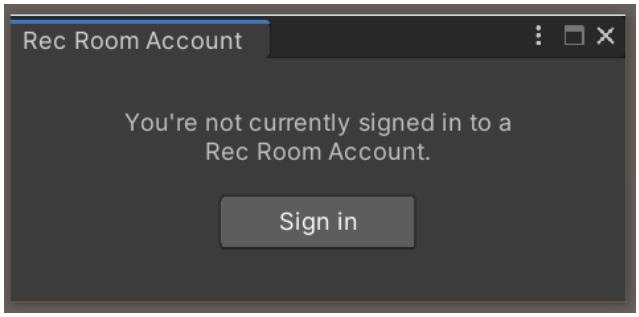
Step 2. Once the Installer is finished, the Rec Room Studio Project will open automatically

a. Wait for Unity to import the project, this might take a few minutes



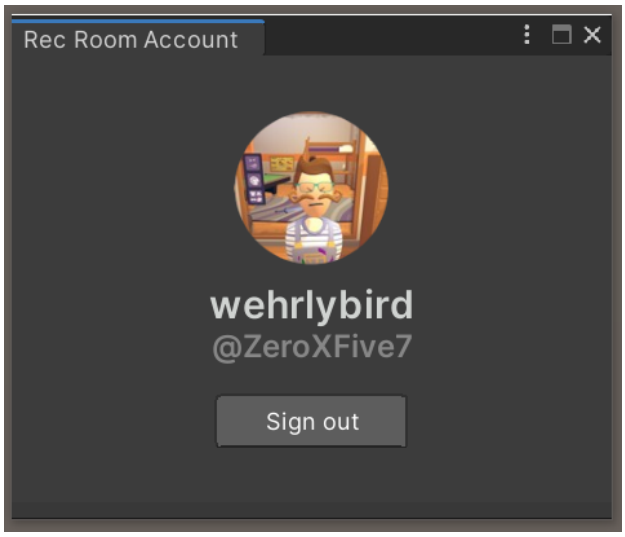
Step 3. Sign into your Rec Room Account from the Rec Room Studio window

a. Click Rec Room Studio > Rec Room Studio to open theRec Room Studio Window (if it isn't already open)
b. Click Sign in to automatically open a new tab in your browser pointed at auth.rec.net



c. Click "Yes, Allow" on the *Rec Room Studio is requesting your permission* web page.

d. Return to Unity and verify that your Rec Room Account shows up in the Rec Room Account Window



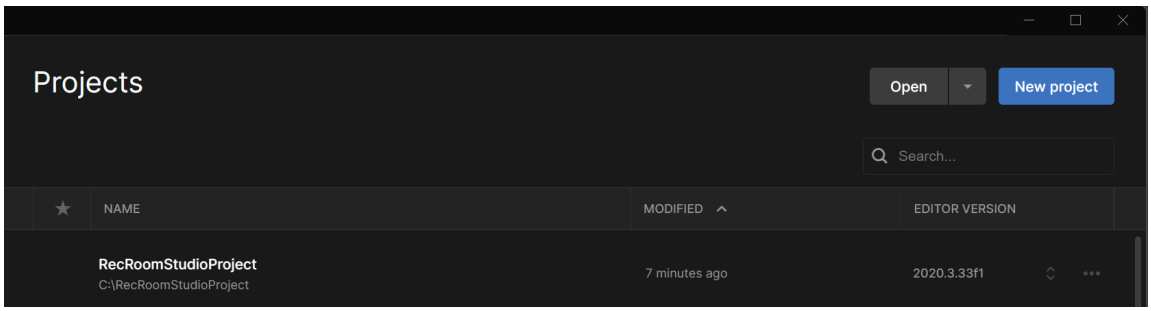
e. You can now close the Rec Room Account Window and Rec Room Studio Welcome Screen.

That's it! Rec Room Studio is now installed and you're ready to start building the next great room!

Opening Rec Room Studio After Installation

Step 1. Open the Unity Hub app on your computer
Step 2. Open your Rec Room Studio project

a. Select RecRoomStudioProject (or the name of your project folder if you named it something else) from the list of projects in Unity Hub



Building in Rec Room Studio

Creating a New Room

Unfortunately you can't currently perform *every* step of the "new room creation process" directly in Rec Room Studio. You need to have a room you own with a subroom based on the Maker Room template to be able to link your Rec Room Studio scene. If you don't already have such a room, first create and name a new room (or subroom of a room you own) based on the basic Maker Room template *in-game*.

Step 1. Launch the Rec Room client, sign into your Rec Room Account

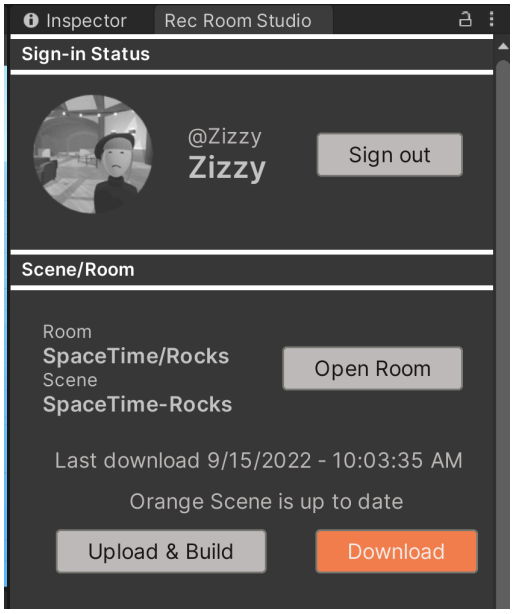
a. This needs to be the same account you used to sign into Rec Room Studio

Step 2. Create a new room in the Rec Room client

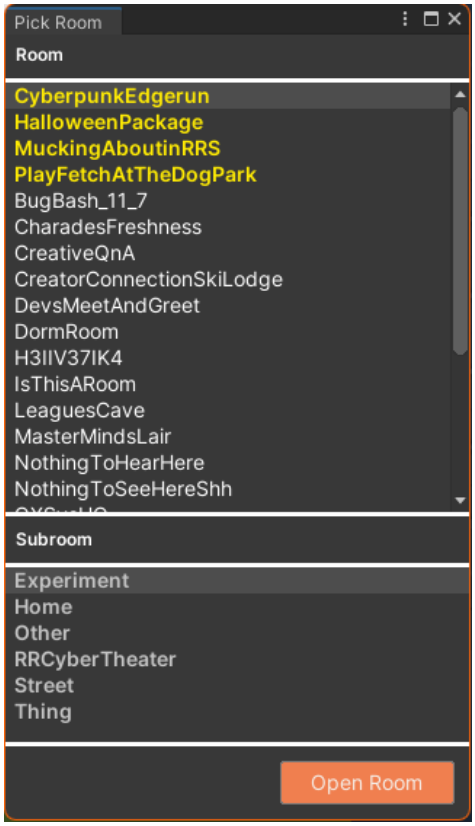
a. Open the watch menu, select Create, then choose the Maker Room template from the Base Rooms tab
b. Name your new room and the game will take you to it

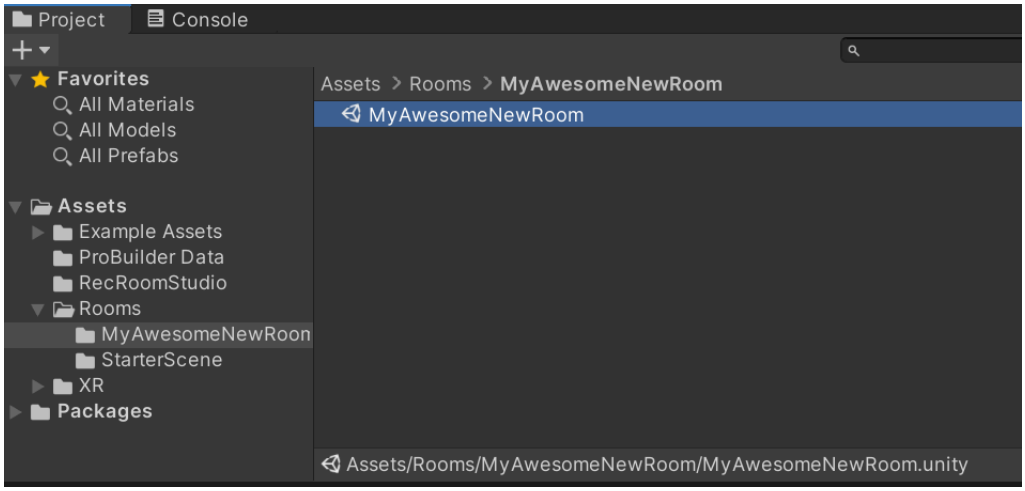
Step 3. Create, save, and open a room in Rec Room Studio

a. In the Rec Room Studio Window, click "Open Room"

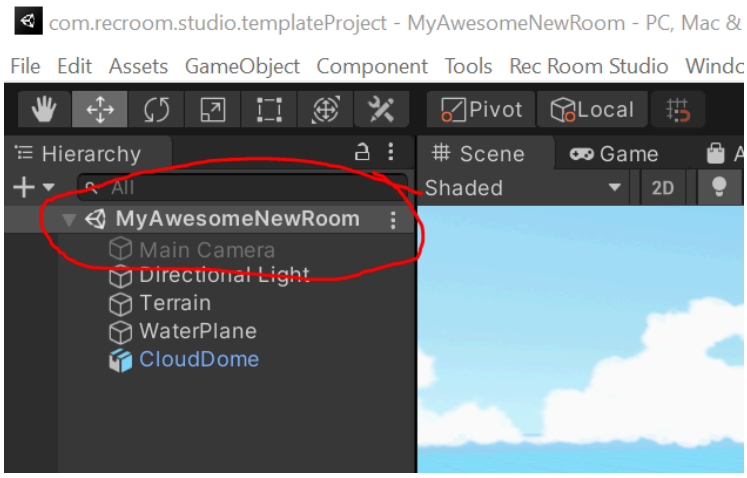


b. Select the Room and Subroom to download from the list (subrooms are listed alphabetically) and select "Open Room." If you have not opened this room in Rec Room Studio on your device before, it will download the latest files from the rec.net server into a folder called *Assets/Rooms/[roomname]*. If your local files are out of date with the server's it will ask you to use the "Download" button to get the latest from the server.





c. Make sure your scene is open in the Editor before continuing. You can tell which scene is open by looking at the name of the scene in the Unity Hierarchy Window



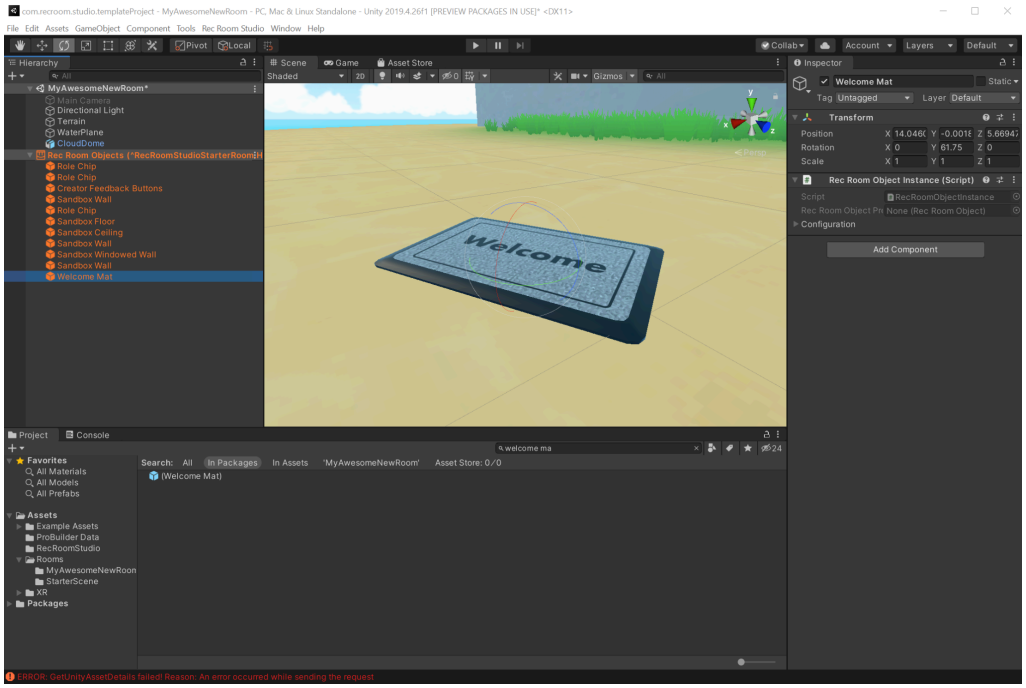
Step 5. Make changes to the room

a. Do all the usual Unity stuff –add 3D objects, terrain, audio, etc. There's so many things you can do, and a few you can't. Check the [Rec Room Studio Known Issues] list for details on specific tools.

Step 6. Place a Welcome Mat in your room

a. Welcome Mats are "Built-in Rec Room Objects" that tell Rec Room where players should spawn when they load your room.

b. Drag a *(Welcome Mat)* prefab from the Unity Project Window into your Scene View or Hierarchy Window. Use the Legacy Welcome Mat if your rooms's settings aren't enabled for beta content. For more information look at [Using Built-In Rec Room Objects].

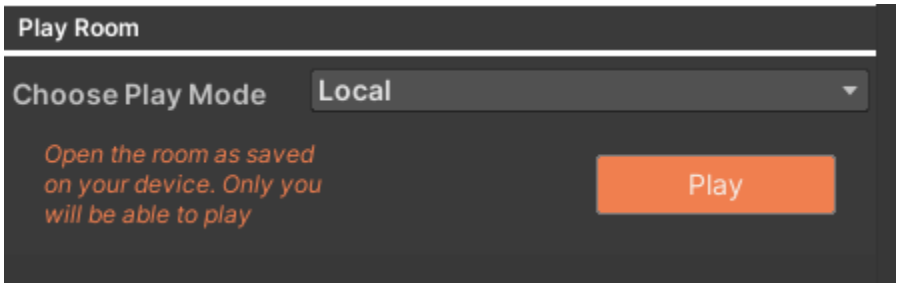
c. 

Step 7. Save the scene

a. While you have your scene open in Unity (it's listed as the top thing in the Hierarchy window), select File > Save to save the scene files to your local disk.

Step 8. Play your room

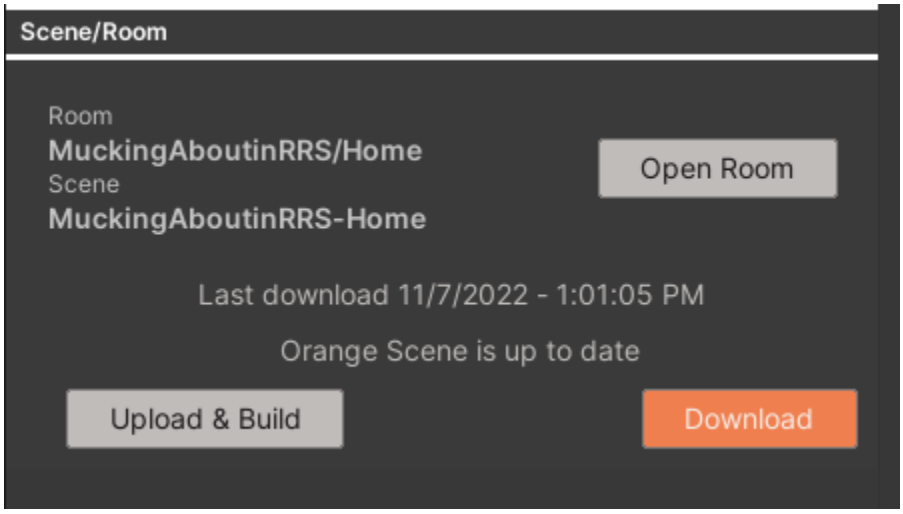
a. From the Rec Room Studio Window>Play Room, click on the Play button



b. There are two types of Play mode:
   i. Local: use this to launch Rec Room on your local device to check your room (in most cases, this is the best option to use)
   ii. Remote: use this to host Rec Room on your local device if you need to simulate a networked game or test your room on another device linked to Unity (e.g. you have a mobile phone or console set up as a development device)

Step 9. Build your room

a. Select the "Upload & Build" button from the Rec Room Studio window



b. **NOTE: Don't close the Build This Room window until building has completed!**
c. Now wait a few minutes for your build to complete (usually 5-10 minutes). You can view progress information in the Build on Rec.net area of the Rec Room Studio window.
d. Now that your build has completed you can load your room in Rec Room on any platform. If you were already sitting in your room you will need to load the room save you just created in Rec Room Studio to see your changes. To do that, go to your watch>

This Room>select the back circle icon to open the Load Save menu>select the latest save (top of the list).

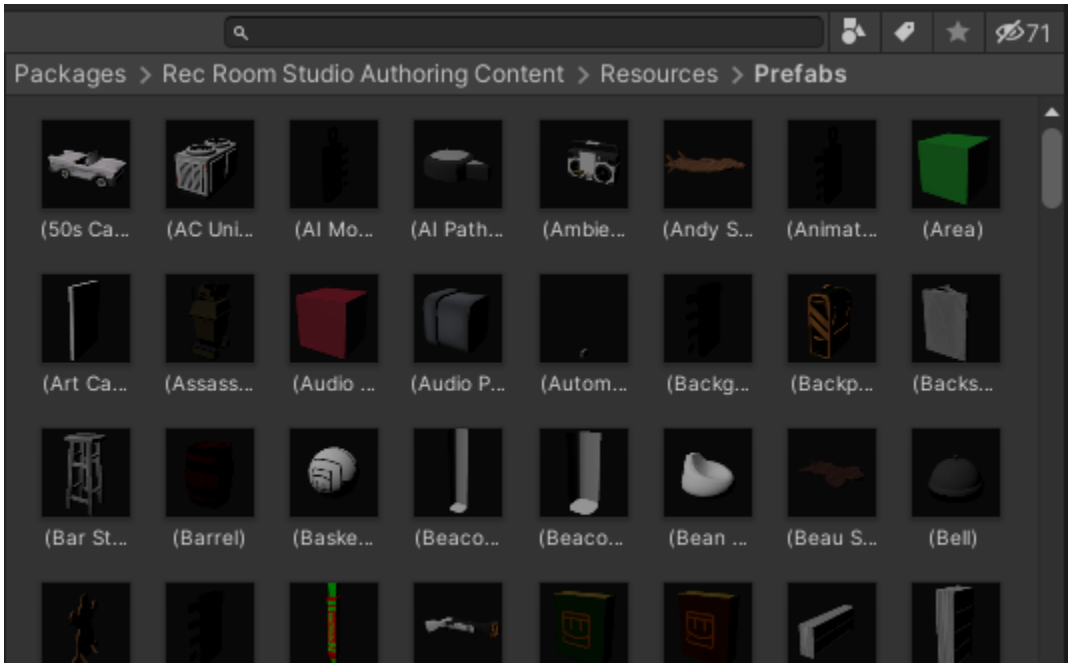
You can now make changes to the contents of your Unity scene as you like. Repeat Steps 7 & 9 to save changes and update your room in-game.

Using Built-In Rec Room Objects

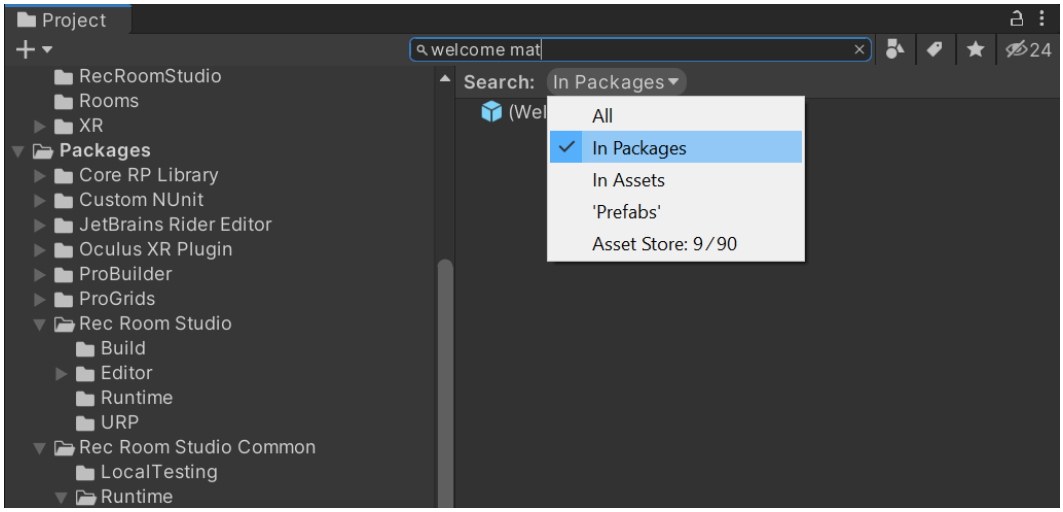
Built-in Rec Room Objects are all of the props, chips, components that exist in-game within the Maker Pen Palette. All of these objects can be browsed, placed, and saved into a room directly within Rec Room Studio.

Step 1. Find built-in Rec Room Objects directory in Rec Room Studio

a. In the Unity Project Window, navigate to *Packages/Rec Room Studio Authoring Content/Resources/Prefabs* –if you can't see this folder, select the eye icon in the upper right of the Project window to show hidden folders

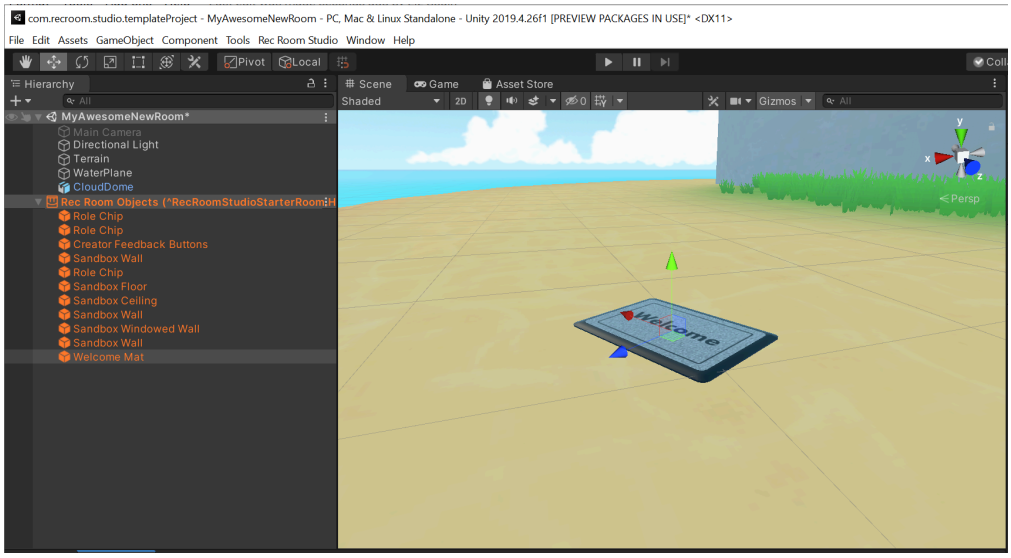


b. You can also search for these built-in objects (if you know the name) by setting the Unity Project Window Search filter dropdown to *In Packages* instead of *In Assets*



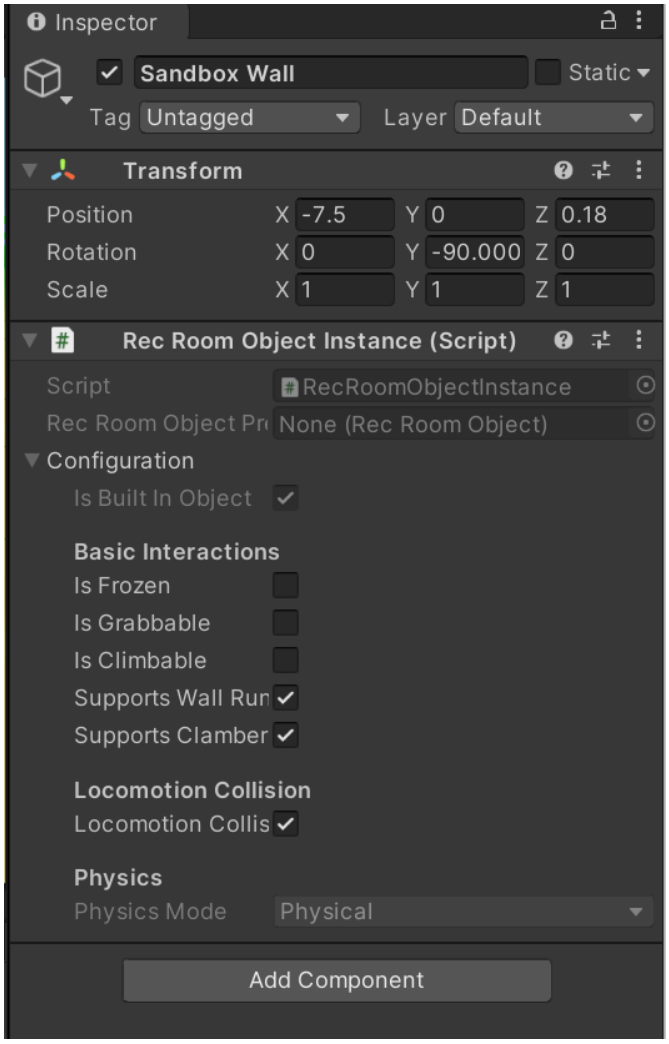
Step 2. Drag a Rec Room Object prefab into the scene view or hierarchy view

a. As soon as you drag a Rec Room Object prefab into the scene it will appear in the Maker Pen Scene hierarchy (the orange-colored one). Rec Room Objects will never appear in the Unity scene hierarchy (white and blue).



Step 3. Translate, Rotate, Scale, and configure this Rec Room Object

a. Rec Room Objects can be transformed and configured in the Inspector Window. Just select the object in the Scene View or Hierarchy Window to open that object in the Inspector Window.



Step 4. Build or test your Room

a. Use Play Local or Upload to build your room and enter it in-game

Step 5. In-game: Use your Maker Pen to modify the Rec Room Object

a. Once in-game, you can use the Maker Pen to interact with Rec Room Objects placed in the room via Rec Room Studio normally.

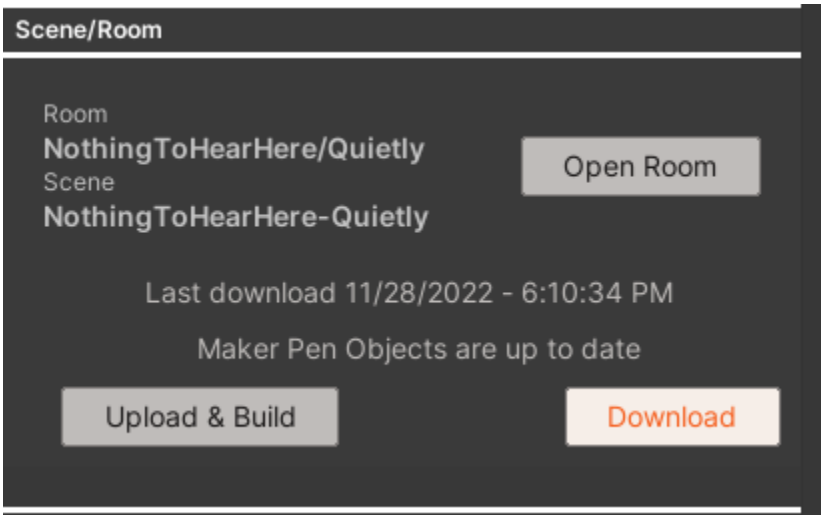
Step 6. In-game: Save your room

a. Open your watch and
    i. If you are playing the room from a Rec.net build, select This Room > Save
    ii. If you are using Play Local mode, select This Room> Send to Studio instead to save your Room changes to your local disk

Step 7. In Studio: Apply the latest changes to your room

a. Back in Rec Room Studio

i. If you made changes to the room from a Rec.net build, select in the Rec Room Studio window>Scene/Room>Download to get your latest changes



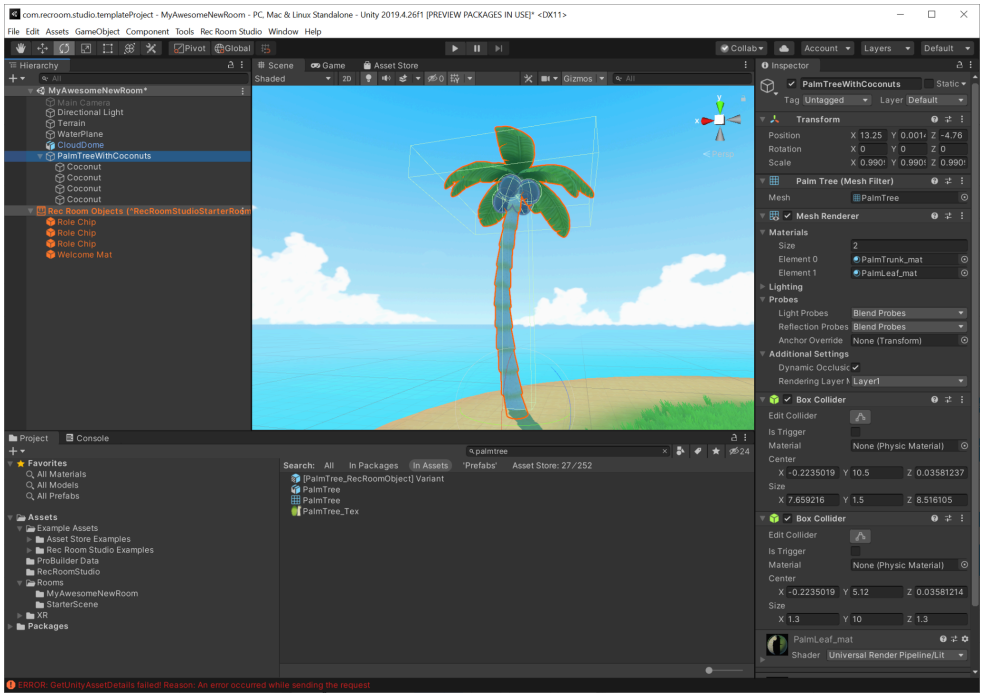
ii. If you are using Play Local mode, your changes should already be applied. Select File>Save to save them to your local disk

Creating Custom Rec Room Studio Objects

Step 1. Create a GameObject in Unity

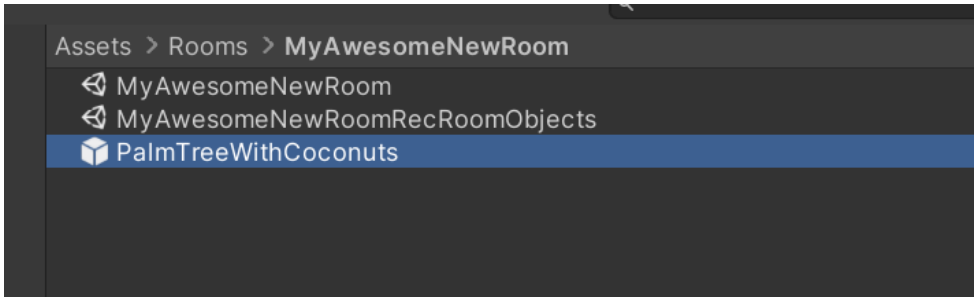
a. Create a fancy new GameObject! It can have an arbitrarily deep hierarchy with as many children, grand-children, great-grand-children, etc as you want. These prefabs can contain all kinds of assets, like meshes with materials, animations, physics joints, colliders.

   For example: here's a palm tree GameObject made from a model imported from Blender. There are some "coconuts" parented to the tree.



Step 2. Convert that GameObject into a Unity Prefab

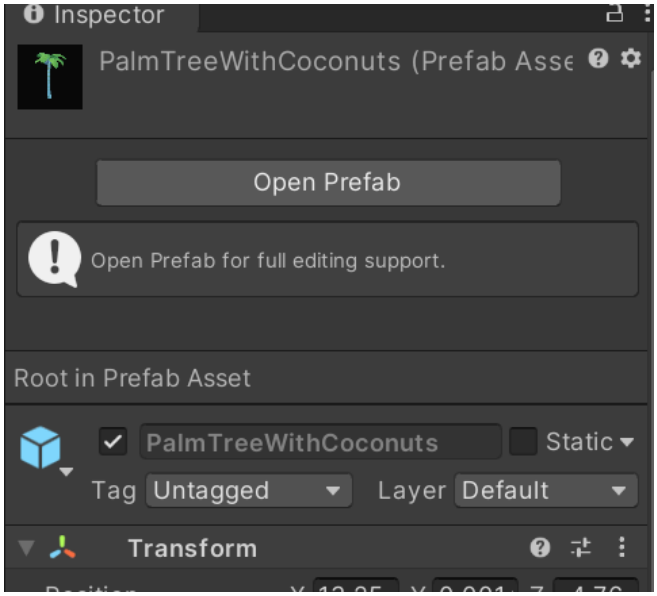
a. Select your object in the scene and drag it into a directory in the Unity Project Window or



Step 3. Open your Unity Prefab in Prefab Edit Mode

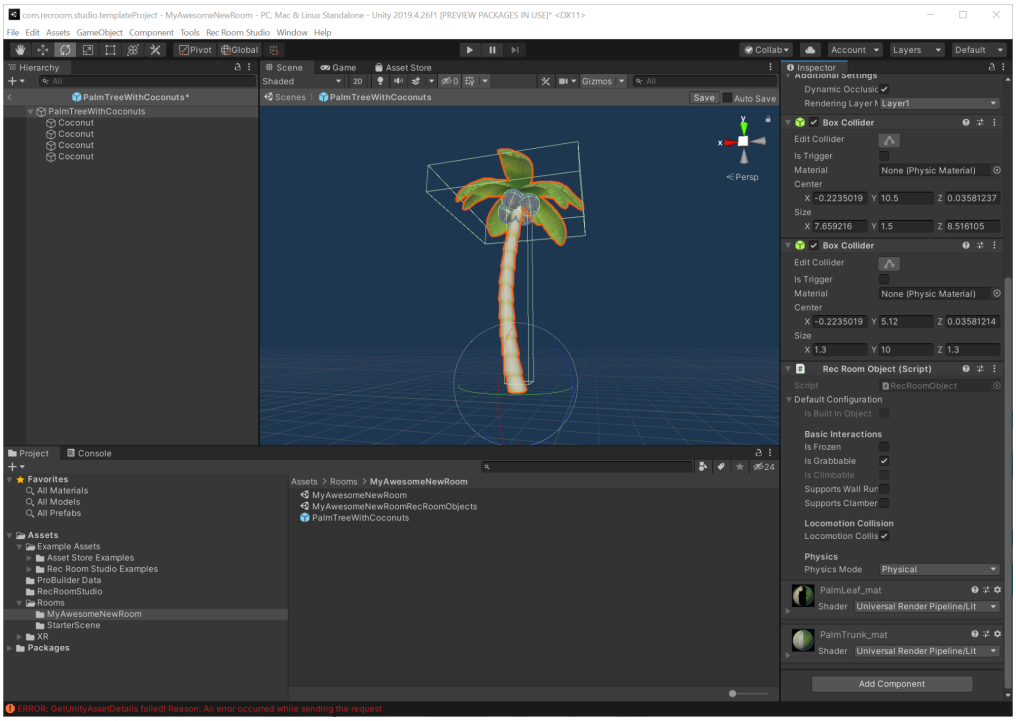
a. Select your prefab in the Unity Project Window - this will make your prefab show up in the Inspector.

b. Click Open Prefab in the Inspector.



Step 4. Add the RecRoomObject component to the root of your new prefab

a. Use the Add Component button in the Inspector to add the RecRoomObject component



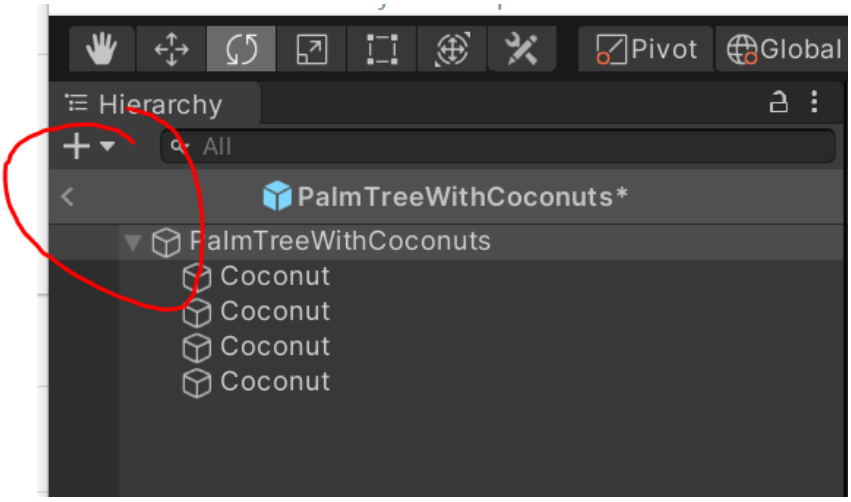
Step 5. Add a Convex Collider to your prefab

a. Select Add Component then choose to add a Box, Sphere, or Capsule collider

b. If you have a Mesh Collider on your prefab already, set its property to “Convex” and not “Concave”

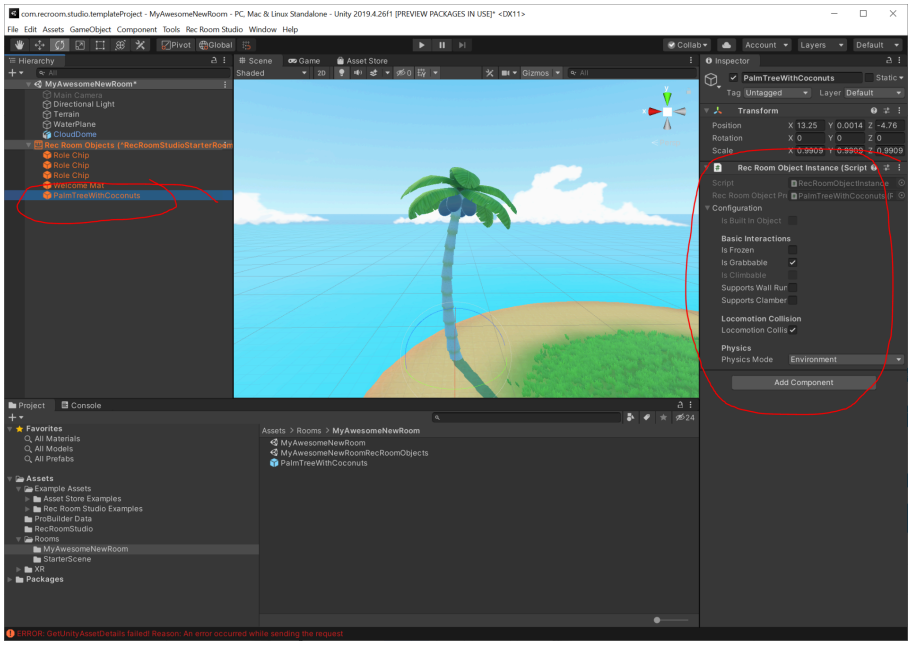
Step 6. Exit Prefab Edit Mode.

a. Click the left-facing Arrow in the top-left of the Hierarchy Window to exit Prefab Edit Mode.
b. If auto-save prefabs is not enabled then you'll be asked whether you want to save the changes you made to your prefab - select Yes.



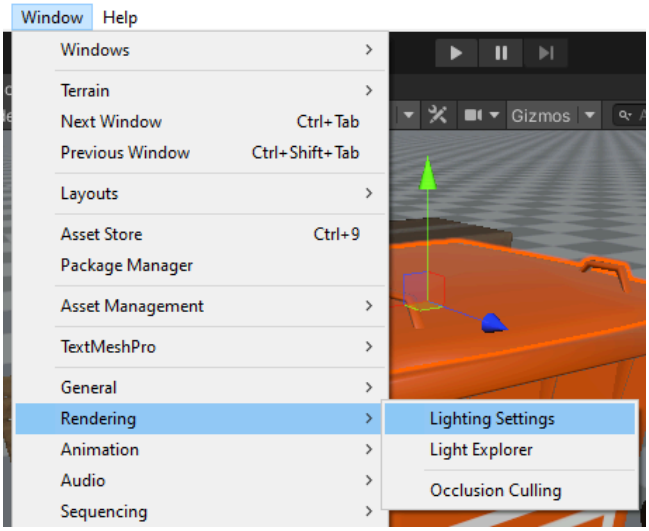
Step 7. Drag this Rec Room Object prefab into the scene (or the hierarchy)

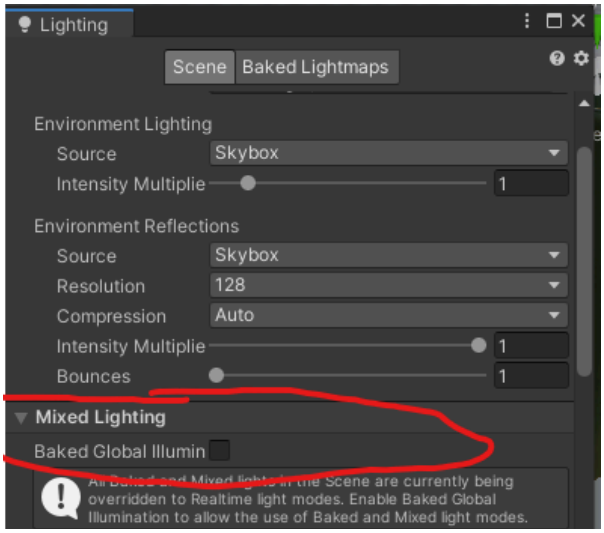
a. When you drag your prefab into the scene it will now show up in the Rec Room Objects hierarchy rather than the Unity Scene hierarchy - this indicates that your prefab has been successfully converted to a Rec Room Object.



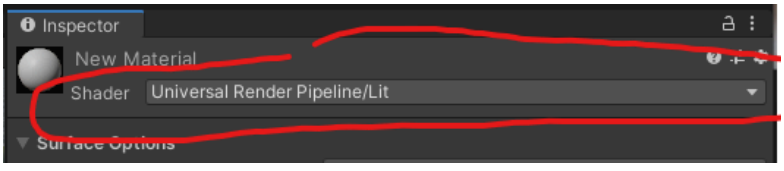
Importing Unity Assets

You can use Unity Assets (from other projects, the Unity Asset store, etc) in your Rec Room Studio project. Once imported (via Window > Package Manager or just dropping the files into your project Assets directory), you'll just need to make sure settings are changed to be compatible.

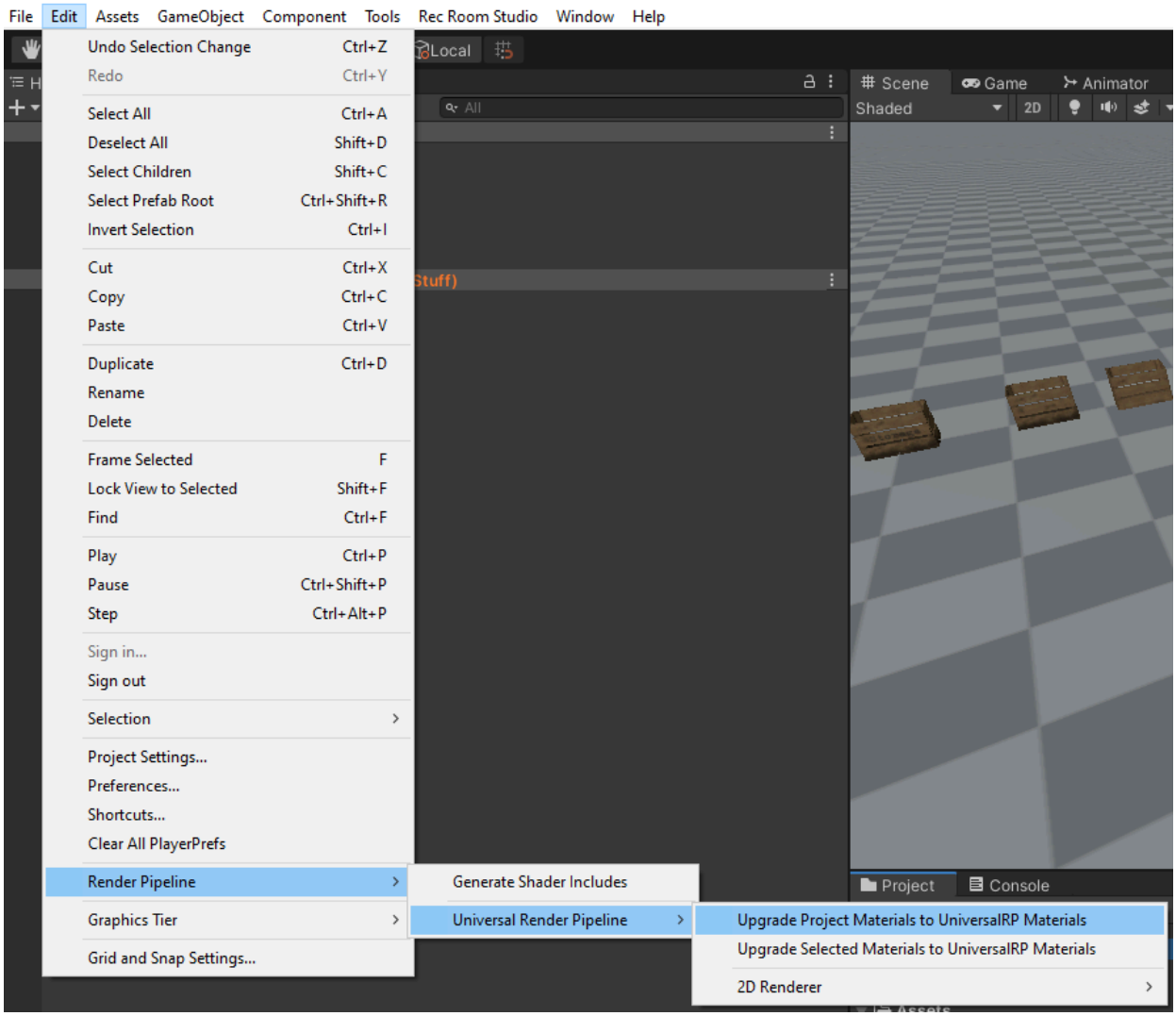




1. **No Baked Lighting**
    a. First off, make sure your scene is set to *not* use baked lighting. Rec Room doesn't support baked lighting and Rec Room Studio won't let you Build with it on.
    b. Go to Window>Rendering>Lighting Settings and make sure the check box for Baked Global Illumination is unchecked
2. **Use only Rec Room Studio shaders in your materials**
    a. Rec Room Studio is built on top of Unity's Universal Render Pipeline. All Shaders used in your scene should use a Rec Room Studio shader. If you import 3D object prefabs and they show up hot pink, check the shader used on the prefabs' material settings in the Inspector



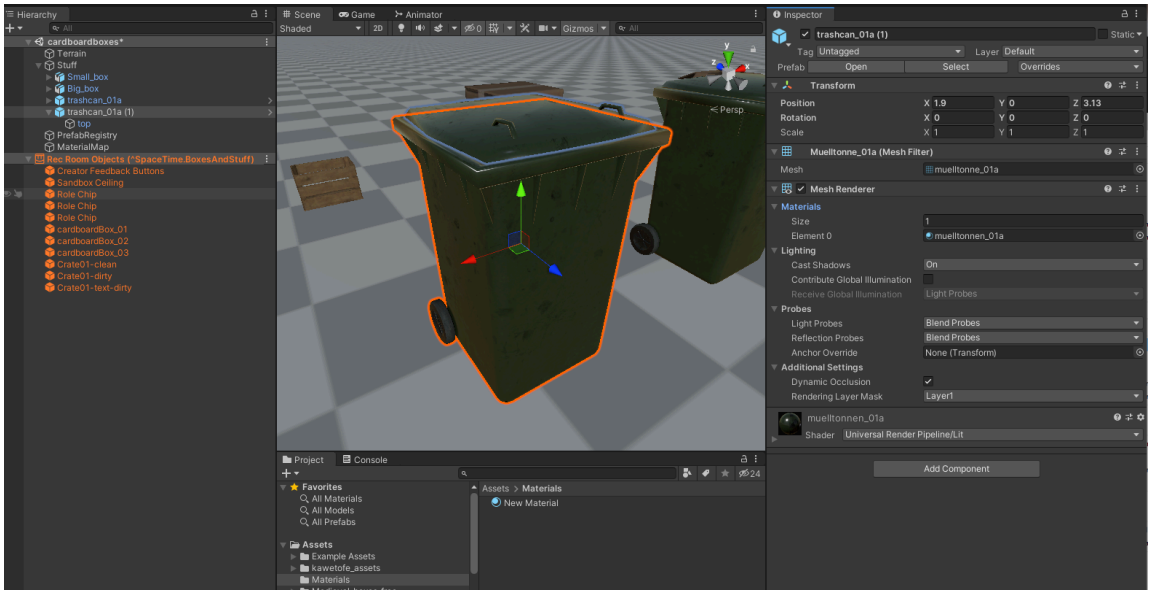
3. **Convert Imported Materials to URP**
    a. If the Materials of your imported assets aren't loading Base textures (albedo), use the Render Pipeline tool to set them correctly
    b. Go to Edit > Render Pipeline > Universal Render Pipeline > Upgrade Project Materials to UniversalRP Materials
    c. Note: this tool doesn't work for all materials if a prefab has more than 1



Creating Materials & Textures

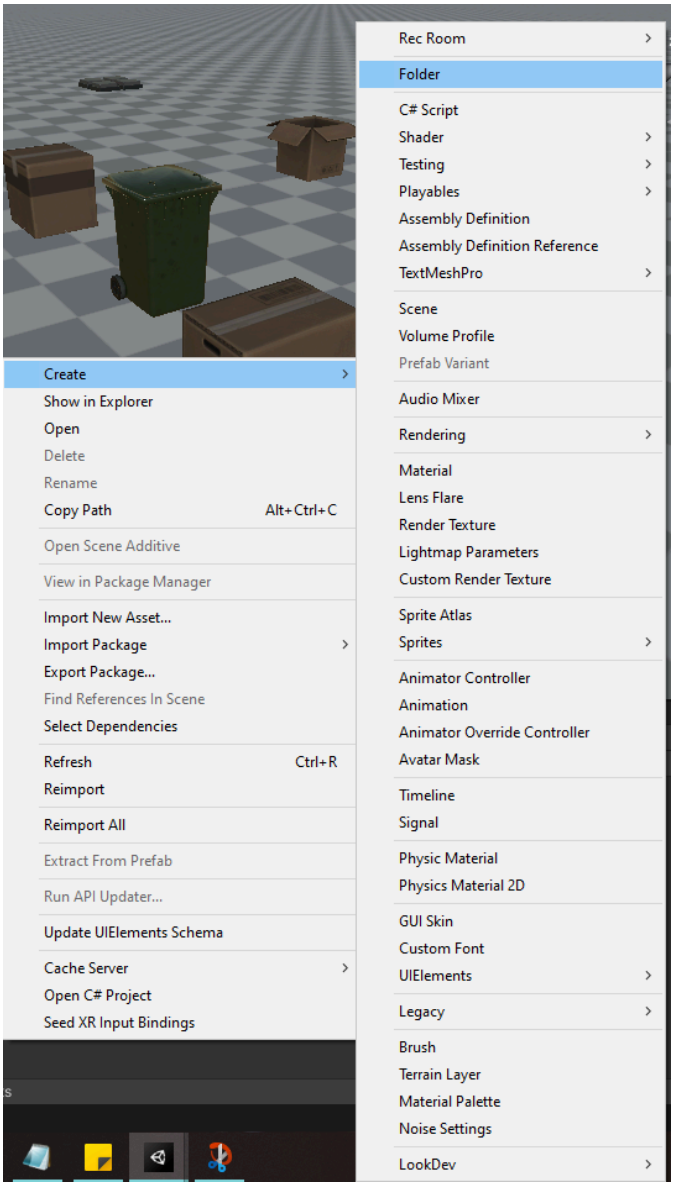
Unity allows you to create and apply materials to 3D objects in your project.

1. **To demonstrate, here's a 3D object**



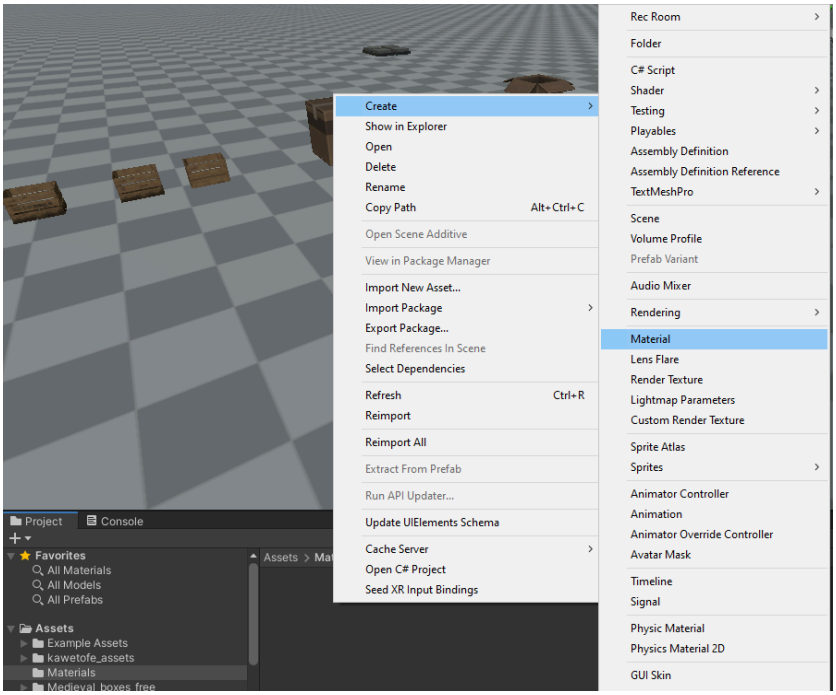
   a. This garbage can in my Rec Room Studio scene is pretty dingy looking. Let's spruce it up.
   b. By selecting the garbage can in the scene Hierarchy, I'll change the material on this particular instance of the garbage can. If I do this from the prefab view (right click on the prefab and select "Open Prefab Asset" or the right arrow in the Hierarchy) and save it, I'll change all the garbage cans in my project.

2. **Keep things tidy with folders**
   a. With the Assets folder selected in the Project window, right click and choose Create>Folder. Name the folder "Materials"
   b. Make another new folder in Assets named "Textures" (since our new Material will need a texture)

C. 

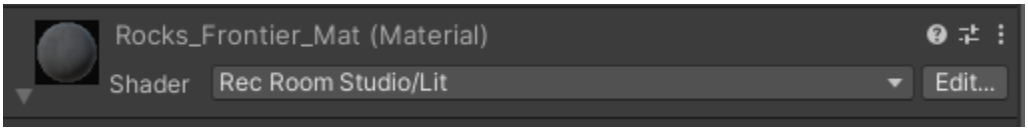
3. Create a new Material

a. While in the Materials folder, right-click and select Create>Material



b. Rename your material by clicking on it in the Project window when it's already selected, or right-click and choose Rename

c. Double-check that your new material is set to use the Rec Room Studio:Lit shader in the Inspector

d. 

4. Create a new Texture

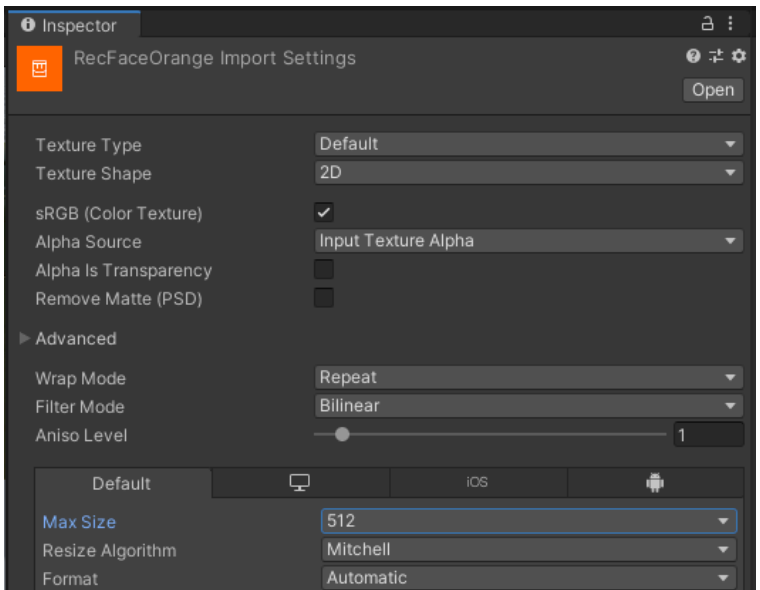
a. In Photoshop or your graphics program of choice, make a square png or psd image. 128x128, 256x256, 512x512, 1024x1024, and 2048x2048 are good sizes for your texture. And because we don't own gold-plated GPUs, 256 or 512 are good sizes. (the bigger your texture files, the longer it'll take for your room to build and load)

b. Save your texture image into the Textures folder you made

5. Import the Texture

a. In the Project window in Unity, select the texture file you just made

b. In the Inspector, set the Max Size to your image dimension, and select Apply

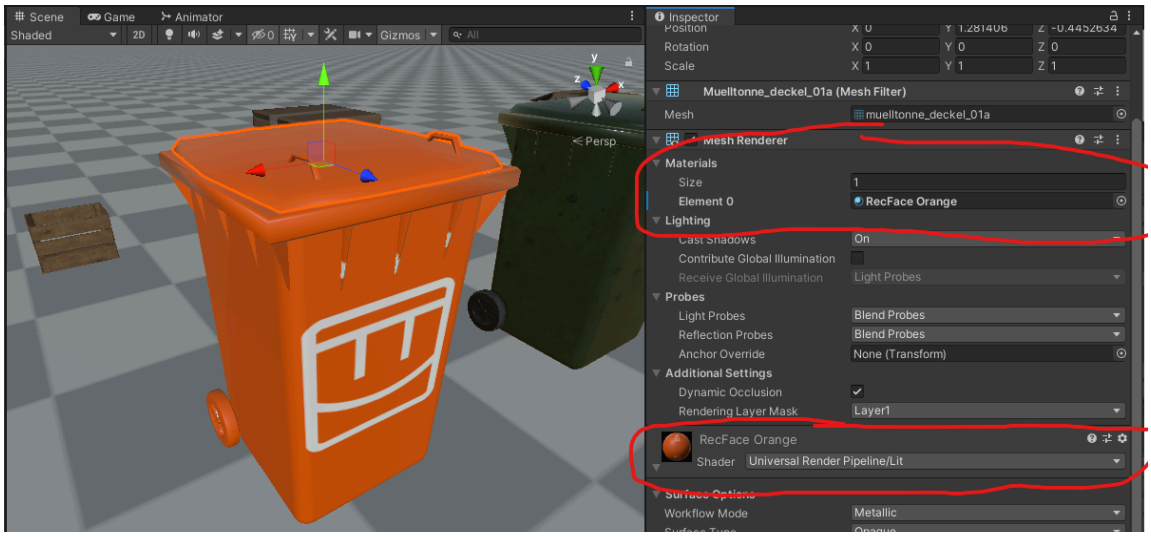


6. Add the Texture to your Material

a. Select the new material you made in the Project window, then click and drag the texture you made

from the Project window to the Inspector window onto the “Base Map” Surface Input setting

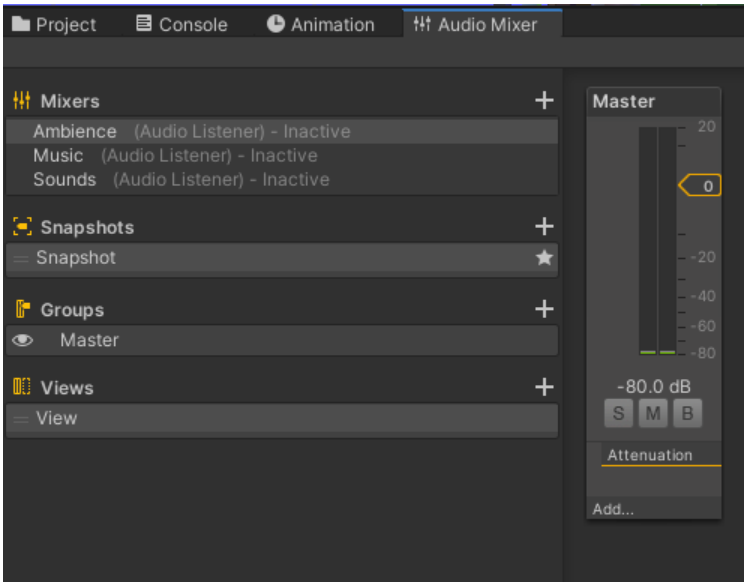
7. **Apply the Material to your 3D object**
    a. Select your 3D object in the Hierarchy (or Open Prefab Asset if you want to change all of the prefab occurrences)
    b. Click and drag your new Material file from the Project window onto the Materials Element setting in the Inspector
    c. Make sure the shader is set to Rec Room Studio: Lit
    d. Muck about with the offset and tile settings until the material is sitting on the object where you want it. Then admire your shiny new look.

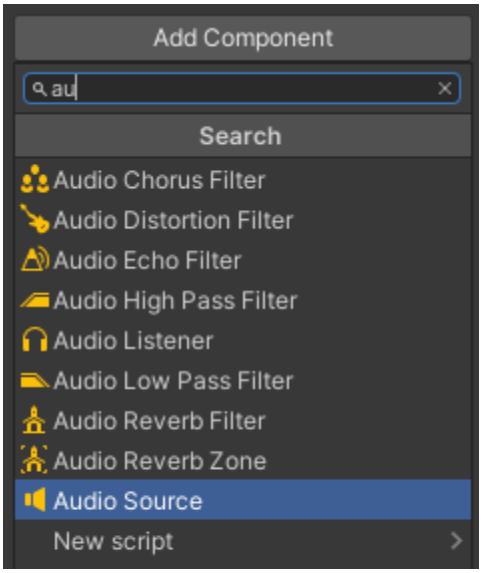


Using Unity’s Audio Tools

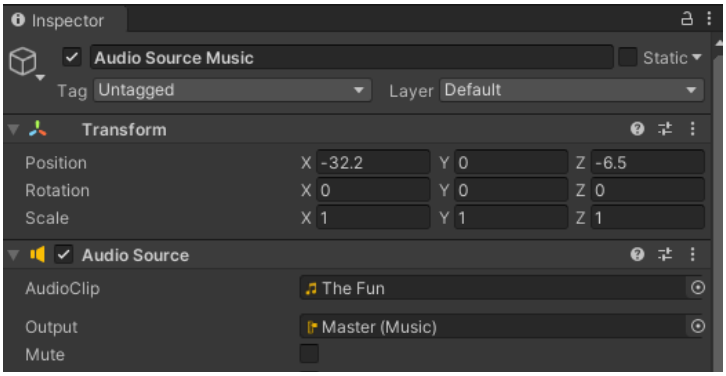
To utilize the existing audio channels in Rec Room, there are special Mixers generated in Rec Room Studio projects.

1. You do not need to add an Audio Listener to your scenes. The Audio Listener is handled by Rec Room in the game client
2. The Audio Mixer in a Rec Room Studio project scene comes with 3 Master Mixers that correlate to the named in-client audio channels: Ambience, Music, and Sounds. These Master Mixers act as the sound input for respective named channels in-client. Do not remove, rename, or reroute these Mixers. Only the Ambience, Music, and Sounds Master Mixers’ output will be heard in the game.

a. 

3. Add Audio Sources to your scene by either
    a. Adding Audio Source objects directly to the scene hierarchy –*select the GameObject menu or right-click in the hierarchy, then select Audio>Audio Source*
    b. Adding Audio Source components to Unity Objects in the scene (blue and gray objects) via the Inspector or Prefab Editor –*select Add Component>Audio Source*
        i. 

    c. Add Audio Source components to Rec Room Studio Objects via the Prefab Editor –open the prefab by
4. Set the output of each Audio Source used in your scene and prefabs to either:
    a. One of the Ambience, Music, or Sounds Master Mixers
    b. Or additional Mixers you have added that will output to the Ambience, Music, or Sounds Master

c. 

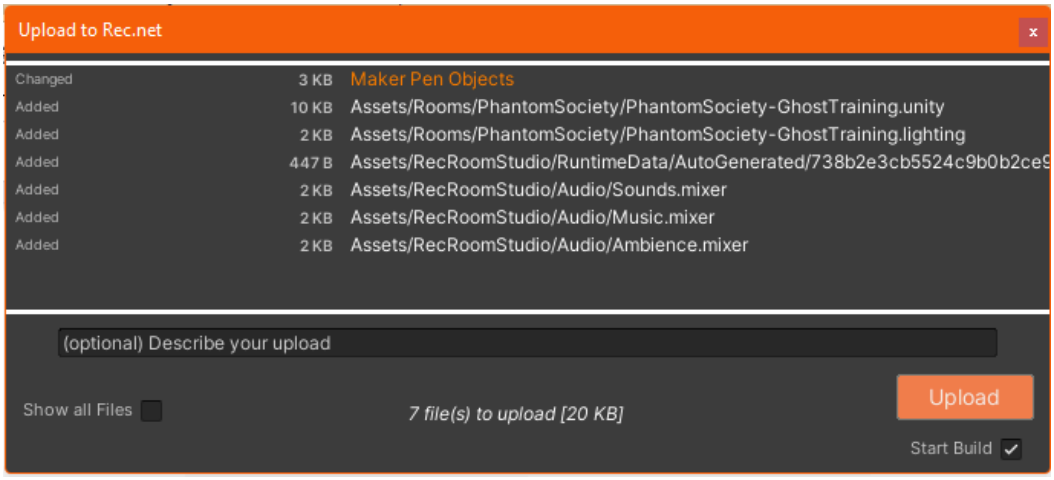
5. When adding effects, you can add them either directly to the Ambience, Music, or Sounds Master Mixers, or to additional Mixers you make in the project.
    a. It is recommended to add scene or area effects to custom Mixers you make because Mixer settings are carried across all scenes in a project.

Mixed-Mode Creation

Creation in Rec Room Studio is a collaboration between Unity developers and Rec Room builders.

1. Edits made to a room in-game with the Maker Pen are built in real-time and committed when the room is saved.
    a. Before a room is published, there can be only 1 private instance of a subroom.
    b. After a room is published, creators can make edits in different instances of a subroom at the same time. This creates conflicts in save states, so avoid doing so.
2. Edits made in Rec Room Studio are done asynchronously and committed and built to the room when the Upload & Build option is selected. There is a 3-10 minute wait while the room is built on the Rec.net servers before it can be played in-game.
    a. If the *Start Build* box under the Upload button is unchecked, the current state of the scene will be saved to the Rec.net servers for download to other devices

running Rec Room Studio, but that save will not be made playable in-game



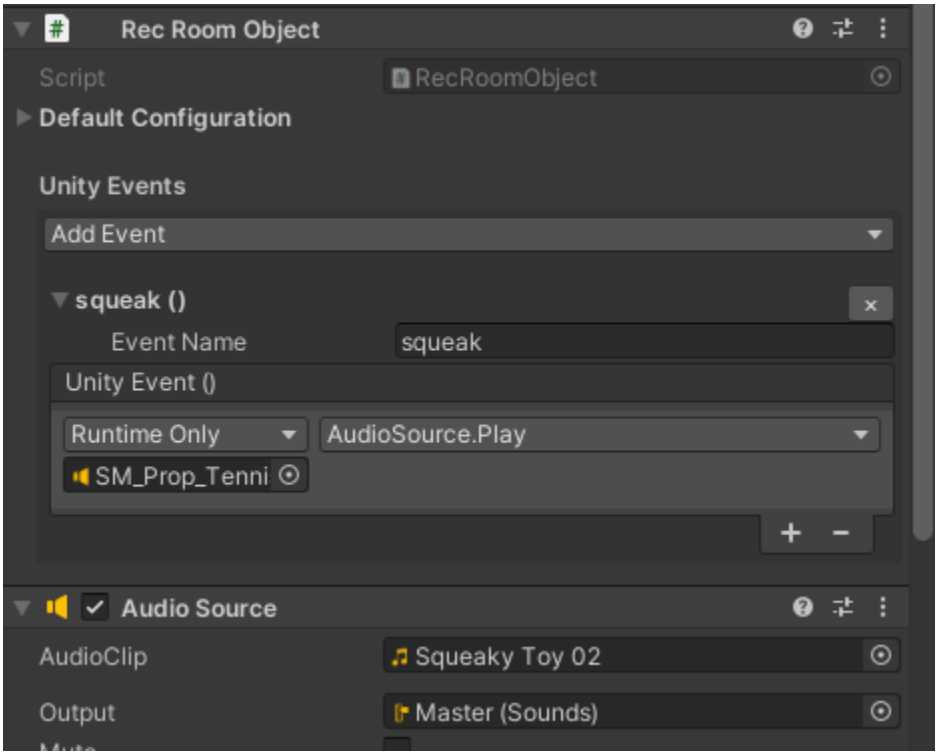
   b. While saves from Rec Room Studio are being built on the server, avoid making changes in-game to that subroom. Any changes made to the subroom while a Rec Room Studio save is in-progress will not be included.
3. Multiple creators can work on the same scene in Rec Room Studio simultaneously by creating prefabs within the scene for each creator to work in. When uploading edits to Rec.net, choose to only upload changes to your prefab and not the whole Unity scene.

Connecting CV2 to Unity Events

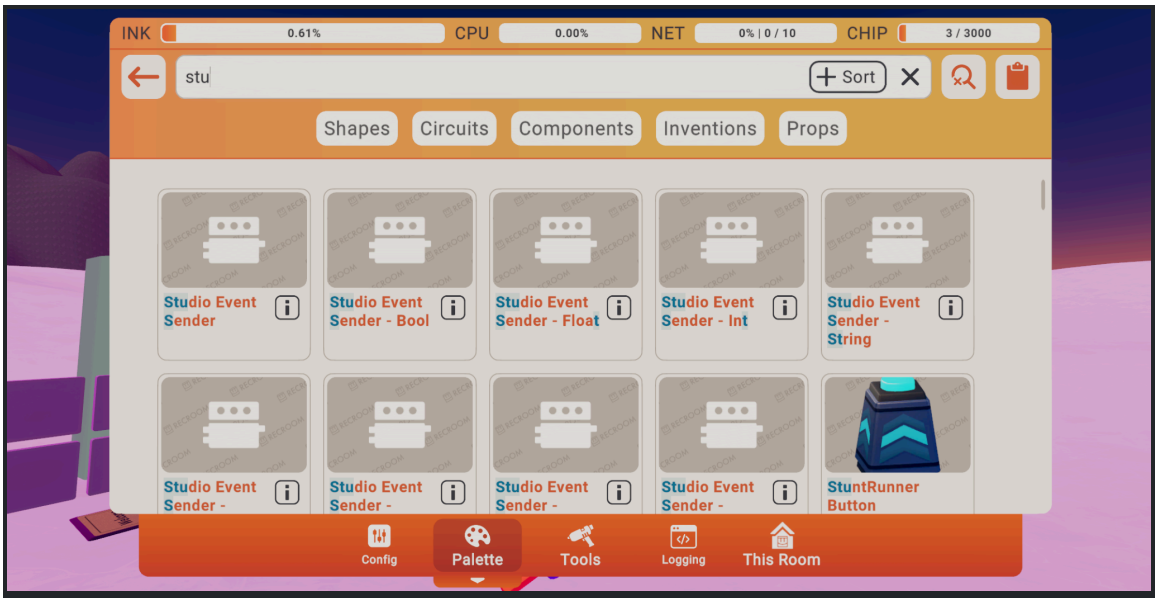
CV2 circuits in Rec Room can interact with objects on Prefabs in Rec Room Studio Rooms via Unity Events. Some properties of Rec Room Studio Objects (such as enabled) can be controlled by Unity Events, and additional objects can be added to prefabs that can be controlled with Unity Events.

1. Note that *Studio Objects* are **different from** *Objects*, so circuits that interpret info from Rec Room Objects will not work with custom Rec Room Studio Objects. However, tags on *Studio Objects* function well.
2. First, make sure the object in your room's scene has been made into a Rec Room Studio Object (see the Creating Custom Rec Room Studio Objects section above)
3. From the Rec Room Object script, add a Unity Event to do the action you want with that Rec Room Studio Object. Give your Unity Event a name, and remember it for later
   a. In this example, I want to make a prefab I made of a tennis ball squeak when picked up or it hits the ground. In the Rec Room Object script on the tennis ball prefab, I have added an *AudioSource.Play* Unity Event and specified the Audio

Source on the tennis ball as the target of the Event. I named the event “squeak”

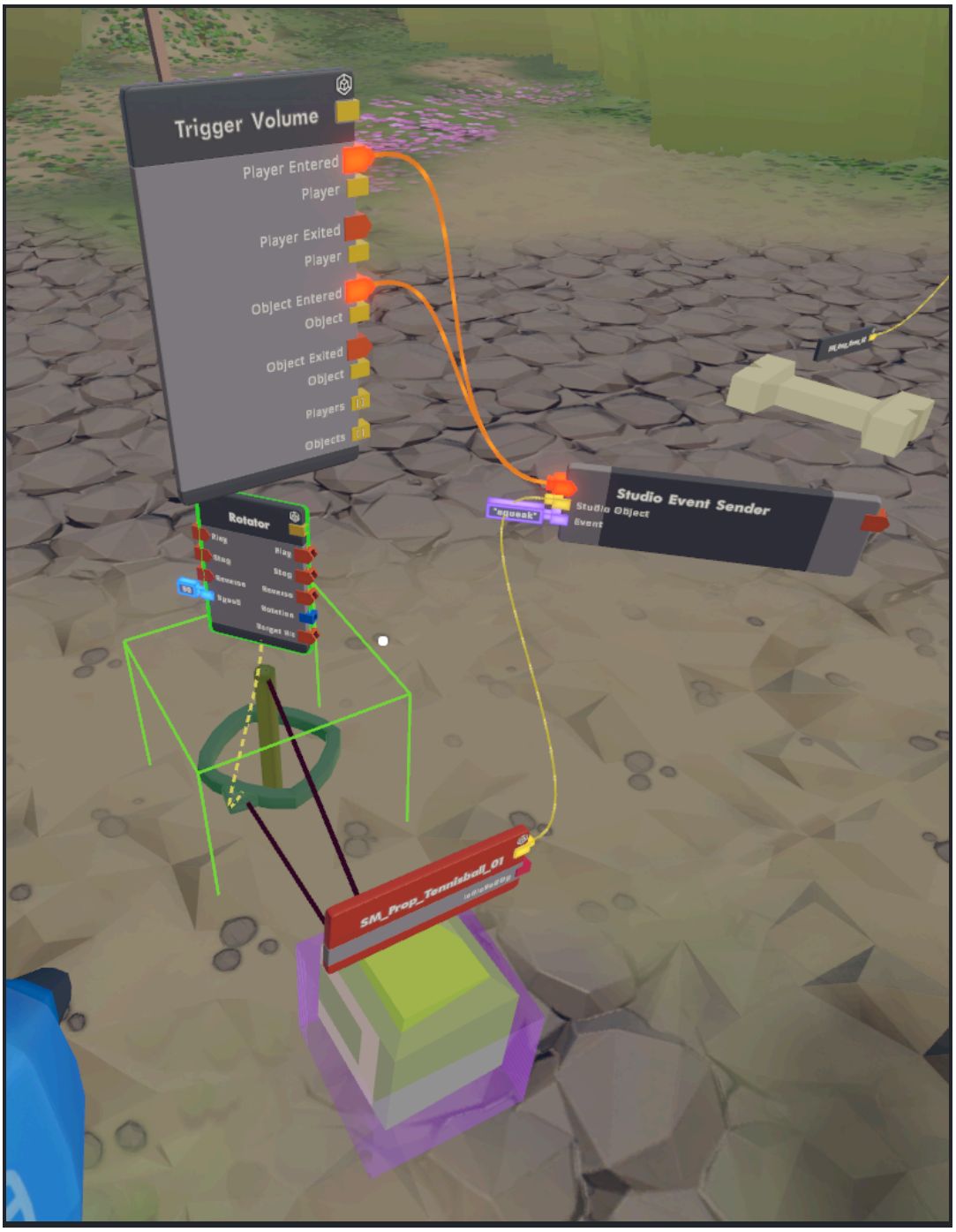


4. Play Local or Upload & Build your room to enter game mode and enter the room where your Rec Room Studio Object is
5. Bring out your Maker Pen and go to the Palette
6. Search for “studio” to find the Studio Event Sender chips



7. Select the version of the Studio Event Sender chip you need. If your Unity Event calls for variables, select the Studio Event Sender chip version that has the variables you need.
    a. For the tennis ball example, the AudioSource.Play event doesn’t need a variable, so the plain *Studio Event Sender* chip will do

    b. If you are triggering a Unity Animation Event, you need a string is to specify the animation parameter name, and another variable to set the value of that parameter (either a bool toggle the parameter on and off, an int, or a float)
8. Connect the Studio Event Sender Chip to the circuit
    a. Add the Studio Event Sender chip to the room, and Connect the Studio Object chip to the Studio Event Sender chip via the yellow tab
    b. Configure the top purple Event string and give it the name of the Unity Event you want to control (for the tennis ball, this is “squeak”)
    c. Connect other circuits to the Studio Event sender chip Exec wires
        i. *Example below:*
            1. *To make the tennis ball make a noise when picked up or hits something, I anchored a Trigger Volume to the Tennis Ball Studio Object using a rotator.*
            2. *Then the Exec wires for Player Entered and Object Entered are connected to the Studio Event Sender configured to trigger the “squeak” Unity Event*

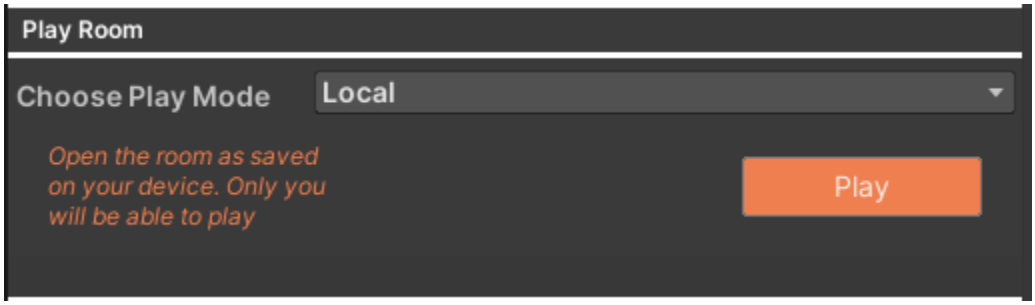

Trigger Volume
Player Entered
Player
Player Exited
Player
Object Entered
Object
Object Exited
Object
Players
Objects
Rotator
Play
Stop
Respawn
Spawn
Rotation
Studio Event Sender
Studio Object
Event
"squeak"
SM_Prop_Tennisball_01

9.

Testing and Publishing Rooms

Testing Your Room

If you want to try out your work, but you're not ready to build your room and save your changes on RecNet, then you'll want to use the "Play Room" options located within the Rec Room Studio menu.



"Local" Tests

"Local" refers to playing your Rec Room Studio room within the *Rec Room Client* you installed with Rec Room Studio- on the same computer you're running Unity! When the play mode is set to Local, clicking on the Play button will launch Rec Room on your computer. Then it will send you to the latest version of your room on your computer. When in Local Play mode, select "Send to Studio" to save changes you make with the Maker Pen to the room.

If Play in Local mode isn't working, you may need the IL2CPP module installed with Unity. See the Additional Modules section of this manual for more information.

"Remote" Tests

"Remote Tests" refer to playing your Rec Room Studio room on another device (PC, phone, VR headset) - without actually building your room save on Rec.net servers.

Note: In order to run a remote test for a particular platform you need to have installed the Unity Build package for that platform. If you want to run a remote test on an iPhone you need to have the iOS Unity Editor build package installed.

Publishing Your Room

Is not allowed until Zizzy or mt1a gives approval. Message Zizzyphus#1029 or mt1a#1176 on Discord with the name of your room for review when you are ready to publish it.

Known Issues

Find out which Unity and Rec Rooms features are currently supported and which aren't in this handy spreadsheet:

Rec Room Studio Known Issues